DATE: April 12, 2005

TO: Doug Howard, Regional Administrator

FROM: Olga Lautt, Associate Engineer

SUBJECT: Keegan, Inc. – Wastewater Land Application Permit Application LA-00b0044-03 (Potato Fresh Pack Wastewater)

PURPOSE

The purpose of this memorandum is to satisfy the requirements of IDAPA 58.01.17.400.04 for issuing wastewater land application permits. It states the principal facts and significant questions considered in preparing the draft permit conditions or the intent to deny, with a summary of the basis for the draft conditions or denial with references to applicable requirements and supporting materials.

PROCESS DESCRIPTION

Keegan, Inc. is located south of Twin Falls, ID and is an industrial fresh potato processor wastewater treatment and land application system. The sediment from washing the potatoes has historically been removed by settling in two earthen ponds prior to land application. Seepage tests were performed during 1996 and it resulted in a rate of 0.619 inches/day and 3.948 inches/day, for west and east pit respectively. The two earthen sedimentation basins were abandoned, because the seepage rates were exceeding the recommended guidance rate. They were replaced in 1997 by an older existing clarifier. Currently, most of the wastewater from the clarifier is recycled in the potato washing process and the reminder is land applied by furrow irrigation to two fields. During the past couple of years the wastewater is discharged to Twin Falls city sewer during most or all of the growing season and all wastewater is discharged to the city sewer during the non-growing season. Figures 1, 2 and 3 attached in the Appendix 2, are the site map location, land application fields and flow diagram for the Keegan, Inc. treatment system.

SUMMARY OF EVENTS

Keegan, Inc. submitted a Wastewater Land Application Permit (WLAP) application on October 6, 1988. WLAP permit LA-000048-01 was issued on March 13, 1989 and expired on February 28, 1994. A WLAP permit renewal application was submitted on August 1, 1994. The WLAP permit LA-000044-02 was issued on January 24, 1996 and expired on January 31, 2001. The third generation WLAP permit renewal application prepared by EHM Engineers, Inc. was submitted on February 7, 2001. As per IDAPA 58.01.17.400.01, the permit application was determined to be complete on February 21, 2002.

Keegan, Inc. wastewater system has historically been operated at low loading. However, in the past several years, there have been instances of non-compliance such as: failure to perform the required monitoring, sampling and reporting, missing the deadline for reducing the non-volatile dissolved solids (NVDS) loadings. Also, it appears that the nitrogen loading rate from wastewater did exceed the permit limit for the 2001 and 2002 reporting years. The nitrogen loading from wastewater land applied was 81.5 and 106 lbs/ac for years 2001 and 2002, respectively. The 150% of the nitrogen removed through the crop uptake was 69.6 lbs/ac for both years. However, there was no wastewater land applied during the 2003 reporting year and a small volume applied in the last part of the 2004 growing season (personal conversation with Bob Keegan on February 22, 2005).

Keegan Inc. was purchased by Cummins Farms in October 2003 and operates under the same name. The current president is Mark Cummins and Bob Keegan is currently the facility manager.

SITE CHARACTERIZATION

SOILS

The land application site is located on soils primarily known as Sluka series, which is silt loam texture. Sluka soils series consist of well-drained soils with the layer between 22 to 39 inches of white lime and silica cemented hardpan over very pale brown silt loam. The available water capacity (AWC) calculated for a depth of five feet resulted in a value of 3.0 inches. This available water capacity (AWC) constitutes a moderate to severe degree of limitation for the land application for a wastewater land application. The soil permeability varies between 0.6 and 2.0 inches/hour for the depths from 0 to 22 inches and from 39 to 72 inches. This is an adequate permeability that could improve the soil surface infiltration.

A summary of the soil analysis at the land application site is presented in Table B in the Appendix 1. The following table gives ranges of various parameters analyzed between years 1996 and 2001.

Table 1

Constituent	Depth: 0-18 inches	Depth : 0-24 inches	Depth : 0-36 inches	Lb/acre, in top 18 inches (avg constituentX6)
Nitrate + ammonium-N (ppm)	32.5 – 38.5	13.65 – 32.5	11.3 – 20.44	213
Phosphorous (ppm)	23.5 - 26	9.0 – 19.0	8.33 – 12.67	148.5
Electrical conductivity (mmhos/cm)	0.95 – 1.6	0.75 – 1.6	0.77 – 1.53	
CEC (meq/100g)	16.2 – 16.75	15.0 – 18.20	14.77 – 17.1	

SAR		0.94 – 1.8	1.01 – 1.80	
Iron (ppm)	5.6 – 6.3	10.55 – 37.10	8.23 – 26.30	
Manganese (ppm)	2.8 – 4.75	5.2 – 6.8	4.67 – 5.20	
Potassium (ppm)	412.5 – 507.50	330 - 495	293 - 373	2760
pH	7.95 – 8.0	7.9 – 8.3	8.2 – 8.37	

As seen in Table 1 above, the sum of Nitrate and Ammonium-Nitrogen are fairly high in the top 18 inches layer. Since nitrate forms of soil nitrogen are susceptible to leaching and can leach out of the plant root zone before they can be used for plant growth, it is critical to continue to monitor the Nitrate-Nitrogen in soil. Also, it is important to provide adequate amount of water to the fields, in order to grow healthy crops that will uptake the nutrients from the soil. The phosphorous is relatively high in the top 18 inches, but since the soil is moderately alkaline (pH between 7.9 and 8.37), the phosphorous is less mobile. The electrical conductivity is in an adequate range and there should be no adverse impacts to the crop growth. The Cation Exchange Capacity (CEC) measurements are between 15 and 17.1 mmhos/cm, which represents an adequate range for the soil ability to adsorb and retain cations and heavy metals. The Sodium Adsorption Ratio (SAR) is adequate for crop growth. Since this parameter appears to be of no concern due to adequate values, it will be monitored only twice during the permit life. The manganese levels are low. The iron levels are fairly high in the layer underlying the top 0-18 inches of soil. This may indicate anaerobic conditions that developed in soil due to hydraulic or COD loads higher than the effective soil treatment potential. However, the iron levels are expected to decrease with the predicted small wastewater land application volumes. Potassium appears in high levels in the top 18 inches, but it is less mobile than nitrogen. Leaching losses of potassium are not significant and have little potential to contaminate ground water.

Staff Recommends: 1) The permittee should continue to perform soil sampling and analysis at the wastewater land application site. 2) An adequate amount of water should be irrigated to avoid the nutrients built up in the soil.

HYDRAULIC LOADING RATES

The growing season for this land application is defined as the period between April 1 to October 31 (214 days). The non-growing season for this land application is defined as the period between November 1 and March 31 (151 days). The hydraulic maximum loading rates were calculated using these time periods.

Growing Season

The following equation was used for the hydraulic rate for the growing season: IWR=[Cu – (PPTe + carryover soil moisture) + LR]/Ei. IWR is the irrigation water requirement or the hydraulic loading rate for the growing season, Cu is the crop consumptive use, PPTe is the

effective precipitation, LR is the leaching rate and Ei is the irrigation efficiency. It was assumed that the carryover soil moisture for the growing season was zero. Also, it was assumed that the leaching rate was zero. Using the Guidance for Land Application of Municipal and Industrial Wastewater – October 2004, the hydraulic rate for growing season was calculated.

Table 2

CROP	CU[a] (in.)	PPTe[b] (in.)	Ei[c] (%)	IWR (in.)	IWR[d] (MG)
Alfalfa, seed	31.69	3.53	57.5	48.98	7.34
Alfalfa, grass hay	39.17	3.53	57.5	61.99	9.28
Spring grain	27.13	3.53	57.5	41.04	6.15
Sweet corn	22.87	3.53	57.5	33.64	5.04
Dry beans	20.55	3.53	57.5	29.60	4.43

a – Estimating Consumptive Irrigation Requirements for Crops in Idaho, by R.G.Allen and C.E.Brockway, August 1983 (http://www.kimberly.uidaho.edu/water/appndxet/index.shtml)
b – Guidance for Land Application of Municipal and Industrial Wastewater – October 2004, Appendix D-1, Station 109303 (Twin Falls Wso); PPT=5.04 inches, assumed that PPTe=70% of PPT
c - Guidance for Land Application of Municipal and Industrial Wastewater – October 2004, Table 2 "Irrigation Application Efficiencies), page IV-7 (average efficiency for the furrow gated-pipe irrigation)
d – The water volume calculation for the irrigation water requirement was done with the assumption that 5.5 acres of irrigated land would be utilized.

As it can be seen from Table 2, the maximum hydraulic loading rate for the growing season ranges from 29.6 inches (4.43 million gallons) to 61.99 inches (9.28 million gallons) depending on the crop. Historically the wastewater to the Keegan's land application site did range from 3.22 million gallons to 8.53 million gallons between years 1996 and 2001. High loading rates of application occurred between years 1996 and 1997, according to the annual reports. Currently, the site is permitted for a maximum hydraulic loading rate to the land application site, of up to the Irrigation Water Requirement (IWR) per year (Schedule A, Wastewater, Site, and Facility Management Conditions, Permit LA-000044-02, page 3 of 15). For the non-growing season, the permitted hydraulic load was of 3.3 million gallons and had to be reduced to 0.37 million gallons by January 1, 1997. During the month of November of 1997, Keegan, Inc. started to send the wastewater to the city of Twin Falls sewer/treatment plant. The Industrial Agreement Discharge Permit (Permit no. 10004R) with the city of Twin Falls allows Keegan Inc. to dispose of their water during the non-growing season (November 1 to March 31) and expires on September 30, 2005. Currently, the permittee is negotiating a renewed permit that would allow the discharge of the wastewater year round (site inspection on September 27, 2004 and personal conversation with Bob Keegan during on February 22, 2005).

From the evaluation of the calculated hydraulic rate for various crops, it appears that the maximum calculated hydraulic loading (61.99 inches, or 9.28 million gallons) rate is above the historic hydraulic land application rate and above the average 5.0 million gallons wastewater volume land applied between years 1995 and 2001 (see Appendix 1, Table A). It appears that

the facility does not apply at this time any supplemental water and the crop appears to be "stressed" due to the water depletion. During recent meeting with Bob Keegan, it was discussed the option of using a smaller lot (one or two acres) and irrigate it weekly with wastewater. In this case, following table shows the wastewater needed to raise the crops and is based on the Irrigation water Requirement (IWR) values from Table 2:

Table 2a

CROP	**IWR (in.)**	**IWR (MG) for 1 acre lot**	**IWR (MG) for 2 acres lot**
Alfalfa, seed	48.98	1.33	2.67
Alfalfa, grass hay	61.99	1.69	3.38
Spring grain	41.04	1.12	2.24
Sweet corn	33.64	0.92	1.83
Dry beans	29.60	0.81	1.61

An analysis of the wastewater nitrogen loading verses the crop nitrogen uptake will be performed in the WASTEWATER QUALITY AND PROPOSED LOADING RATES section. The analysis will help in determining the crop(s) that would uptake the optimum nitrogen levels.

During the inspection of the site on March 5, 2002 the wastewater flow measurement was discussed with Bob Keegan. During the non-growing season, when the facility sends the wastewater to the city of Twin Falls sewer/treatment plant a flowmeter is used to record the flow. During the growing season the wastewater flow to the land application site is determined based on a water balance. The flow meters used to determine the amount of wastewater sent to the land application site, should be calibrated and checked for accuracy annually to ensure compliance with all the permit limits.

Staff Recommends: 1) Limit the yearly hydraulic loading rates to IWR wastewater land application. No wastewater irrigation should be allowed during the non-growing season (between November 1 and March 31 of the following year) 2) The permittee should use a smaller lot and irrigate weekly the wastewater to ensure adequate crop yields and the uptake of nutrients from the soil. 3) The permittee will prepare an updated Operation and Maintenance Manual (O&M Manual) for the wastewater treatment system, using the Guidance for Land Application of Municipal and Industrial Wastewater – October 2004, Plan of Operation Checklist (page V-13). Information regarding the wastewater flow monitoring and recording, flowmeters calibration should be included.

WASTEWATER QUALITY AND PROPOSED LOADING RATES

The wastewater characteristics and constituent loading rates for the years between 1995 and 2001 are as follows:

Table 3

Constituent	Concentration range Yearly averages, ppm	Loading rates[1] Lbs/ac
Total N (Nitrate-N + TKN)	7.2 to 16.4	33.7 to 132.6
COD in lb/ac-day (GS-214 days)	93.3 to 287.5	0.2 to 8.4
Total P	1.2 to 3.1	3.3 to 54.1
NVDS	289.3 to 480.0	973 to 4309

1 - Calculations based on hydraulic loading and wastewater available data (see Table A in the Appendix 1)

The proposed crops N and P uptake loadings were calculated and summarized in the following table:

Table 4

CROP	**AVERAGE YIELD DRY MASS[a] (tons/acre)**	**%N on DRY MASS BASIS[b]**	**%P on DRY MASS BASIS[c]**	**N (lb/ac/yr)**	**P (lb/ac/yr)**	**150%N (lb/ac/yr)**	**150%P (lb/ac/yr)**
Alfalfa, seed	4.0	2.25	0.22	180	17.6	270	26.4
Alfalfa, grass hay	5.0	1.87	0.21	187	21	280.5	31.5
Spring grain or wheat	1.2 (40 Bu./acre)	2.08	0.62	49.92	14.88	74.88	22.3
Sweet corn	5.5	0.89	0.24	97.9	26.4	146.85	39.6
Dry beans	0.5	3.13	0.45	31.3	4.5	46.95	6.75

a – Typical yields were taken from Agricultural Waste Management Field Handbook, Part 651, pages 6-19 to 6-22 ;
b,c - %plant nutrient uptake were taken from Agricultural Waste Management Field Handbook, Part 651, pages 6-19 to 6-22

The uptake rates calculated in Table 4 are based on a typical crop yield found in the Agricultural Waste Management Field Handbook, Part 651. As it can be seen from the above table, for alfalfa grass the typical Phosphorus uptake rate would be approximately 21 lb/ac-yr (based on a 5 tons/ac-yr yield). The calculated Phosphorus loading rate from the wastewater land applied resulted in a value as high as 54.1 lb/ac-yr during 1997 (more than twice the crop uptake). However, as discussed in above sections, there was no wastewater irrigated during the 2003

reporting year and a small volume was applied in the last part of the 2004 growing season (personal conversation with Bob Keegan on February 22, 2005). According to Bob Keegan it is expected that the wastewater loading rates would continue to decrease. During recent meeting with Bob Keegan, it was discussed the option of using a smaller lot (one or two acres) and irrigate it weekly with wastewater. In this case, less (IWR) water would be needed, as shown in Table 2a. Based on the performed calculations two (2) acres site would be adequate to grow alfalfa and/or grass hay and meet a 150% crop uptake for nitrogen. The phosphorus will continue to be monitored in the soil at the land application site.

Staff recommends: 1) Perform soil sampling and testing to monitor Nitrogen and Phosphorus values and calculate the Nitrogen and Phosphorus loading rates of the wastewater land applied. 2) The permittee should irrigate weekly a field measuring at least two (2) to ensure adequate crop yields and the uptake of the nutrients from the soil.

Constituent loading rates for nitrogen, COD, and growing season hydraulic loading rates will be set based on the recommendations found in the Guidelines for Land Application of Municipal and Industrial Wastewater – October 2004.

The following table shows the historic, predicted crop uptake loadings and the proposed wastewater loading rate limits for the permit renewal:

Table 5

Parameter	Units	Historic rates 1996 to 2003	Predicted uptake Loadings lb/ac/yr	Future Proposed Loading Rate
Hydraulic Loading Rate	Million gallons	1.77 to 8.82	(na)[1]	Up to IWR
Total Nitrogen	lbs/acre-year	33.7 to 132.6	(46.95 to 280.5)[2]	150% of crop uptake
Total Phosphorus	lbs/acre-year	3.3 to 54.1	(4.5 to 26.4)[2]	No limit established at this time
COD, GS average (214 days)	lbs/acre-day	0.2 to 8.4	na	50
NVDS	lbs/acre-year	973 to 4309	na	No limit established at this time

1 – See Tables 2 and 2a for IWR requirements for various crops and acreages (5.5 acres, 2 acres, and 1 acre).

2 – The uptake rates calculated in Table 4, are based on typical crop yield. The N uptake values represent 150% of crop uptake; the P uptake values represent 100% of crop uptake.

When the historic Total Nitrogen loading rates values in the above table are compared with the predicted uptake rates values, it appears that the proposed future loading rates are adequate. As previously discussed in the Soils section the Total Nitrogen loadings are fairly high in the top soil layer, and they almost tripled between 1996 and 2001. Although it is expected that the wastewater loading rates would continue to decrease, the nitrogen wastewater loading will be limited to 150% of crop uptake.

Due to the reduction in the wastewater volumes, additional calculations were performed to determine the acreage needed to raise an adequate crop and uptake the nitrogen loadings from the wastewater applied. A summary of the calculations can be found in the table below:

Table 5a

Crop type	Yield (tons/ac)	Typical crop uptake				lb N from wastewater	lb P from wastewater
		%N	1.5 x (lb N) LIMIT	%P	1.5 x (lb P)		
Alfalfa, seed	4	2.25	270	0.22	26.4	182	34
Alfalfa, grass hay	5	1.87	280.5	0.21	31.5	231	44
Spring grain	1.2	2.08	74.88	0.62	22.32	153	29
Sweet corn	5.5	0.89	146.85	0.24	29.6	125	24
Dry beans	0.5	3.13	46.95	0.45	6.75	110	21

Notes: In calculating the N and P loadings, IWR values from Table 2a were used and maximum concentration from Table 3 (16.4 ppm for N, 3.1 ppm for P). The N and P loadings are similar for one (1) and two (2) acres because the ratio IWR/acres is a constant.

From the above table, it appears that alfalfa (seed), alfalfa (grass hay) and sweet corn nitrogen (N) uptake times one and a half is adequate compared to the amount of nitrogen (N) loading from the wastewater. In conclusion, smaller sections of the entire site (one or two acres lots) may be used to grow an adequate crop with the available wastewater.

The P loading from the wastewater appears to exceed the P crop uptake. However, the soil P concentration (see Table 1) is less than the recommended levels shown in the DEQ guidance

regarding phosphorous application rates (issued in December 2003) http://www.deq.state.id.us/water/wastewater/guidance_phosphorous1.doc The soil concentration will continue to be monitored at the site.

The loading rates for chemical oxygen demand (COD) did range between 0.2 and 8.4 lb/ac-day, between years 1996 and 2001. Those loadings are adequate for the land application of the wastewater during the growing season.

The Non-Volatile Dissolved Solids (NVDS) loadings were required to be reduced below 4000 lbs/ac-yr, by January 1, 1997 (see Schedule A, Site Loading Limits table, page 3 of 15 of the current permit). However, the reduction occurred after November 1, 1997. In the document "Keegan's Inc., 1997, Wastewater Land Application Site Performance Report", page 2, the NVDS loadings are shown to be 4,558 lb/acre-yr (after Jan. 1, 1997) and 6,298 lb/acre-yr (between November 1, 1996 and October 31, 1997). Between years 1998 and present, the NVDS loading rate did range between 973 and 3208 lbs/ac-yr, and is expected to decrease.

Staff recommends: 1) The permittee should irrigate weekly at least two (2) acres of farm to ensure adequate crop yields and the uptake of the nutrients from the soil. 2) Wastewater should be monitored monthly, during the land application.

GROUNDWATER

As discussed in the Staff Analysis of Keegan, Inc. dated January 17, 1996 (from Michael Cook to Martin Bauer) "no hydrogeological information was submitted in the application. A ground water monitoring network and protocols are included in the permit as there is a good possibility the loading of this site has caused local contamination". The requirement for a monitoring well network, including plans and specifications for construction of the wells, consisting of upgradient and downgradient well(s) in the first aquifer encountered beneath the site was included in the current Wastewater Land Application Permit dated January 29, 1996 (Schedule C, Compliance Conditions and Schedules, item 3). The monitoring wells network Compliance Condition is discussed on page 5 of the Permit Re-Application, dated January 2001: "*Keegans Inc. began non growing season discharge to the City of Twin Falls in 1998. This reduced loadings below Par Level 1 levels. Keegans submitted a written request to delete the requirement for expensive* groundwater monitoring wells on January 8, 1997".

In the same Permit Pre-Application, it is stated that potential "ground water contamination problems as a result of present or past wastewater- land application land use activity " may exist. However, there is no information provided (hydrogeological information or groundwater well data) that explains why there are ground water contamination problems, due to the land application. The facility needs to provide detailed cause(s) for the "groundwater contamination

problems" and demonstrate that the request to have groundwater monitoring network installation requirement removed is well justified. However, there was no wastewater land applied during the 2003 reporting year and a small volume applied in the last part of the 2004 growing season (personal conversation with Bob Keegan on February 22, 2005). Also, currently the permittee is negotiating a renewed permit with the city of Twin Falls that would allow the discharge of the wastewater year round (personal conversation with Bob Keegan during September 27, 2004 site inspection and on February 22, 2005). Consequently, an alternative to the well monitoring network may be proposed. For example, a management plan to further continue to reduce the NVDS loadings at the site would address the TDS concern in groundwater.
See also the discussion of the Compliance Condition 3, in the following section.

Staff Recommends: The permittee will submit for DEQ's review a detailed report, prepared by a qualified hydrogeologist, that will demonstrate that the land application practices at the site did not caused any groundwater contamination and the request to install a groundwater monitoring network is no longer necessary.

CURRENT PERMIT COMPLIANCE CONDITIONS

Conditions 1 and 2 (pond seepage and repair, replacement or abandonment of ponds exceeding the guidance seepage rate) were fulfilled. The result of the seepage test showed that the seepage rates were in excess. Consequently, the ponds operation was discontinued and a clarifier is presently used for the silt settling prior to land application.

Condition 3 (monitoring well network) On page 3 of the document "Keegan's Inc., 1997, Wastewater Land Application Site Performance Report" Item 3 discusses the request that *"groundwater monitoring be deleted from their existing permit. The reason for the request is as follows:*

- *Wastewater from the potato fresh pack is composed of primarily inorganic sediments. With non growing season discharge to the Twin Falls City sewer system field loadings will be within permit limits.*
- *There is no use of groundwater within ½ mile of the Keegan Land Application site.*
- *The cost of implementing a monitoring system is not warranted".*

Following are DEQ's comments in addition to the discussion provided in the previous section, regarding the groundwater well monitoring:

- One of the mechanisms used in evaluating the efficiency of a land application system to treat the wastewater in such a way that groundwater is protected for existing and projected future beneficial uses is to install a groundwater monitoring well network and determine compliance or non-compliance with groundwater standards; the allowable loading limits are initially established based on the available information for the site, initial modeling and best science. The groundwater monitoring is the mechanism by which the effectiveness of the maximum allowed nutrient loadings are verified.

- Potential contamination may extend beyond a ½ mile of a facility land application site, depending on the aquifer characteristics.
- Please refer to the above Groundwater section of this document, for additional discussion and the staff recommendation.

Condition 4 (convert furrow to sprinkler irrigation) The requirement to convert the irrigation system on the wastewater land application site to sprinkler irrigation was included in the current WLAP Permit dated January 29, 1996 (Schedule C, Compliance Conditions and Schedules, item 4). This Compliance Condition requirement is discussed on page 5 of the Permit Re-Application: "*Keegans Inc. requested that this requirement be deleted (January 8, 1997 letter)*". The letter dated January 8, 1997 is referencing yet another document (Keegan's Inc., 1997, Wastewater Land Application Site Performance Report). In the 1997 Site Performance Report on page 3, the following is stated: *"Keegan's Inc. also repeats it's 1996 request that the requirement for sprinkler irrigation be deleted"*. The permittee is justifying the request with the same reasons cited above under Condition 3 (monitoring well network).

Following are DEQ's comments:

- The wastewater is applied to a land application site whose soils consist of well-drained soils with a layer between 22 and 39 inches of white lime and silica cemented hardpan. This may have caused the accumulation of nutrients (i.e. nitrogen, phosphorus) at the cemented pan soil interface, and the potential for ground water and aquifer contamination is high. A sprinkler irrigation system would allow for a far better management of the wastewater application (i.e. reduced wastewater applications, split applications).
- In the past, the facility experienced significant crop death due to mismanagement of the flood irrigation. More even hydraulic application of the wastewater will result in a better wastewater treatment management.

In case the wastewater continues to be land applied at the hydraulic rates reported between years 1989 and 2002, the Department believes that the requirement to convert the furrow irrigation system to sprinkler irrigation is still necessary and reasonable. An alternative to the conversion to sprinkler system is to redesign and manage the furrow irrigation such that the application rates will match the infiltration rates. However, as discussed above under Condition 3 (monitoring well network) there was no wastewater land applied during the 2003 reporting year and a small volume applied in the last part of the 2004 growing season (personal conversation with Bob Keegan on February 22, 2005). Also, currently the permittee is negotiating a renewed permit with the city of Twin Falls that would allow the discharge of the wastewater year round (personal conversation with Bob Keegan during September 27, 2004 site inspection and on February 22, 2005). Consequently this requirement may be waived, if the wastewater land application rates continue to be substantially reduced and wastewater is irrigated weekly to a smaller lot (i.e. one or two acres).

Conditions 5 and 6 (cropping plan and waste solids management plan). Letters were submitted on April 30, 1996 and September 12, 1996 to address those conditions. However, an updated Waste Solids Plan will be required.

Staff Recommends: 1) The permitte should convert the furrow irrigation system to a sprinkler irrigation system **or** redesign and manage the furrow irrigation such that the application rates will match the infiltration rates. 2) The permittee will submit to the Department for review and approval an updated Waste Solids Management Plan. The Plan should demonstrate that all the waste solids will be utilized or disposed in a manner which will prevent their entry, or the entry of contaminated drainage or leachate, into the waters of the state such that health hazards and nuisance conditions are not created, and impacts on designated beneficial uses of the groundwater are prevented.

BUFFER ZONES AND WELLHEAD PROTECTION

The irrigation at this site is done by a gravity flow system with gated PVC pipe. Following table shows the recommended minimum buffer distances between the land application site and various locations.

Table 6

Buffer Object	Recommended Minimum Buffer Distance[1] (ft)	Existing Required Buffer Distance (ft)
Dwellings	300	100
Public access areas	50	na
Natural surface water bodies	100	50
Man-made irrigation conveyances	50	na
Domestic water supplies	500[2]	na
Public water supplies	1000[2]	na
Irrigation and Monitoring Wells	25[3]	na

1. Justification will be provided by the permittee for review by DEQ, if permittee desires buffer distances less than those in the table above.
2. Unless a DEQ approved Well Location Acceptability Analysis indicates an alternative distance is acceptable.
3. Recommended to prevent the well from acting as a conduit allowing wastewater to reach the aquifer.

Staff recommends: The buffer zones will be maintained at the land application site as required. Justification will be provided, and approved by DEQ, for the recommended distances less than those shown in the table above.

SURFACE WATER CONSIDERATIONS AND FLOOD ZONES

The nearest surface water is Perrine Coullee, which runs approximately 400 ft north-east of the land application site.

Staff Recommends: The permittee should employ Best Management Practices (BMPs) to prevent applied wastewater and any runoff from leaving the land application site. The BMPs should be included in the updated O&M Manual and submitted to DEQ for review and approved prior to implementation.

GRAZING

According to the Wastewater Land Application permit renewal document, submitted February 7, 2001, grazing is not proposed at the wastewater land application site.

RECOMMENDATION

Staff recommends that the attached land application draft permit be issued, for the renewal of the Keegan, Inc. wastewater land application permit.

Appendices:
1. Table A (Management Unit Summary)
Table B (Soil Analysis)
2. Figure 1 (Site Map Location)
Figure 2 (Land Application Field Location)
Figure 3 (Flow Diagram)

cc: Source files WLAP LA-000044-03 (SO&TFRO)

APPENDIX 1

Keegan Inc.

Wastewater Land Application Permit

LA-000044-03

TABLES

Soil Analysis

TABLE B

Keegan Inc. WLAP LA-000044-03

SOIL ANALYSIS

Sample Date smpldate	depth top (inches) depthtop	depth bottom (inches) depthbot	Soil Mon. Unit soilunit	organic matter (%) ssom	Nitrate (ppmN) ssnitrate	Ammonia (ppmN) ssammonia	Nitrate + Ammonia	Organic N lb/ac	SAR sssar	EC (mmhos/ cm) ssec	Na (meq/ 100 g sssodium	pH (S.U.) ssph	CEC (meq/100g) sscec	Phos (ppm) ssphostot	K (ppm) sspotsium	Ca (meq/ 100 g sscalcium	Mg (meq/ 100 g ssmg	DTPA Fe (ppm) ssiron	DTPA Mn (ppm) ssmn
22-May-95	0	12	East & West	1.60	7.00			35	3.70	0.80	0.2	8.00	24.60	12.0	415.0	19.3	3.7		
22-May-95	12	18	sites	1.35	7.00			35	3.80	1.00	0.3	8.00	25.90	7.0	325.0	20.9	3.6		
Avg. 0 to 18 in.				**1.60**	**7.00**		**7.0**	**35.00**	**3.70**	**0.80**	**0.20**	**8.00**	**24.60**	**12.00**	**415.00**	**19.30**	**3.70**		
24-Mar-96	0	12	East & West	1.15	10.00	6.70	16.7	40.0	0.84	0.7	0.2	8.20	16.30	10.0	470.0	11.2	3.3	14.4	7.0
24-Mar-96	12	24	sites	2.25	6.00	4.60	10.6	30.0	1.03	0.8	0.2	8.30	13.70	8.0	190.0	10.0	2.9	7.8	4.0
24-Mar-96	24	36		0.95	4.00	6.10	10.1	30.0	1.16	0.8	0.2	8.40	14.30	7.0	220.0	10.0	3.4	6.6	3.0
Avg. 0 to 24 in.				**1.70**	**8.00**	**5.65**	**13.7**	**35.00**	**0.94**	**0.75**	**0.20**	**8.25**	**15.00**	**9.00**	**330.00**	**10.60**	**3.10**	**11.10**	**5.50**
Avg. 0 to 36 in.				**1.45**	**6.67**	**5.80**	**12.5**	**33.33**	**1.01**	**0.77**	**0.20**	**8.30**	**14.77**	**8.33**	**293.33**	**10.40**	**3.20**	**9.60**	**4.67**
						Ammonium-N													
9-Mar-98	0	12	East & West	2.30	13.0	2.8	15.8	45.0	0.75	0.8		8.2		19.0	505.0			10.7	8.4
9-Mar-98	12	24	sites	1.30	9.0	1.6	10.6	30.0	1.20	0.9		8.4		8.0	265.0			10.4	5.2
9-Mar-98	24	36		0.85	6.0	1.5	7.5	25.0	1.12	1.1		8.5		8.0	165.0			3.6	1.1
Avg. 0 to 24 in.				**1.80**	**11.00**	**2.20**	**13.2**	**37.50**	**0.98**	**0.85**		**8.30**		**13.50**	**385.00**			**10.55**	**6.80**
Avg. 0 to 36 in.				**1.48**	**9.33**	**1.97**	**11.3**	**33.33**	**1.02**	**0.93**		**8.37**		**11.67**	**311.67**			**8.23**	**4.90**
23-Mar-99	0	12	East & West	2.80	16.00	5.90	21.9	50.0	1.10	1.00	0.2	8.20	18.10	23.0	640.0	11.9	3.9	25.7	8.4
23-Mar-99	12	24	sites	1.75	16.00	6.00	22.0	40.0	1.20	1.30	0.6	8.20	18.30	12.0	350.0	12.2	4.3	48.5	5.0
23-Mar-99	24	36		1.15	15.00	2.40	17.4	30.0	3.10	2.30	0.8	8.20	14.90	3.0	130.0	9.8	3.9	4.7	2.2
Avg. 0 to 24 in.				**2.28**	**16.00**	**5.95**	**22.0**	**45.00**	**1.15**	**1.15**	**0.40**	**8.20**	**18.20**	**17.50**	**495.00**	**12.05**	**4.10**	**37.10**	**6.70**
Avg. 0 to 36 in.				**1.90**	**15.67**	**4.77**	**20.4**	**40.00**	**1.80**	**1.53**	**0.53**	**8.20**	**17.10**	**12.67**	**373.33**	**11.30**	**4.03**	**26.30**	**5.20**
18-Jan-01	0	12	East Site?	2.0	16.00	9.00	25.0	40		1.0	0.1	8.00	16.00	30	545	10.8	3.3	6	5.1
18-Jan-01	12	18		1.8	30.00	10.00	40.0	40		0.9	0.2	7.90	17.50	22	470	11.7	4	6.6	4.4
Avg. 0 to 18 in.				**1.88**	**23.00**	**9.50**	**32.5**	**40.00**		**0.95**	**0.15**	**7.95**	**16.75**	**26.00**	**507.50**	**11.25**	**3.65**	**6.30**	**4.75**
18-Jan-01	0	12	West Site?	2.0	28.00	8.00	36.0	40		0.8	0.4	7.90	16.40	39	640	10.6	3.3	6.2	3
18-Jan-01	12	18		1.3	30.00	11.00	41.0	30		1.7	0.5	8.00	16.00	8	185	11	3.9	4.9	2.6
Avg. 0 to 18 in.				**1.6**	**29.0**	**9.5**	**38.5**	**35.0**		**1.3**	**0.5**	**8.0**	**16.2**	**23.5**	**412.5**	**10.8**	**3.6**	**5.6**	**2.8**
25-Nov-01	0	12	East & West	1.8	35.00	2.90	37.9	40	1.85	2.0	0.3	7.70	15.60	28	460	10.3	3.5	11.3	6.8
25-Nov-01	12	24	sites	1.1	24.00	3.10	27.1	30	1.73	1.1	0.3	8.10	15.40	10	260	10.8	3.4	12.7	3.6
Avg. 0 to 24 in.				**1.5**	**29.5**	**3.0**	**32.5**	**35.0**	**1.8**	**1.6**	**0.3**	**7.9**	**15.5**	**19.0**	**360.0**	**10.6**	**3.5**	**12.0**	**5.2**
1-Apr-02	0	12	East & West	2.4	12.00	4.50	16.5	45	1.02	1.1	0.3	8.10	14.80	24	410	9.7	3.4	9	5.1
1-Apr-02	12	24	sites	1.6	23.00	3.20	26.2	35	0.96	1.2	0.3	8.20	14.10	11	285	9.7	3.1	10.6	3.7
Avg. 0 to 24 in.				**2.0**	**17.5**	**3.9**	**21.4**	**40.0**	**1.0**	**1.2**	**0.3**	**8.2**	**14.5**	**17.5**	**347.5**	**9.7**	**3.3**	**9.8**	**4.4**
12-May-04	0	12	East & West	2.1	26.00	7.50	33.5	40		1.2	0.3	7.90	16.10	22	330	11	3.7	21.5	3.5
12-May-04	12	24	sites	2.0	20.00	6.60	26.6	40		1.3	0.3	8.00	16.90	21	390	11.3	4	9.9	2.2
Avg. 0 to 24 in.				**2.0**	**23.0**	**7.1**	**30.1**	**40.0**	**#DIV/0!**	**1.3**	**0.3**	**8.0**	**16.5**	**21.5**	**360.0**	**11.2**	**3.9**	**15.7**	**2.9**

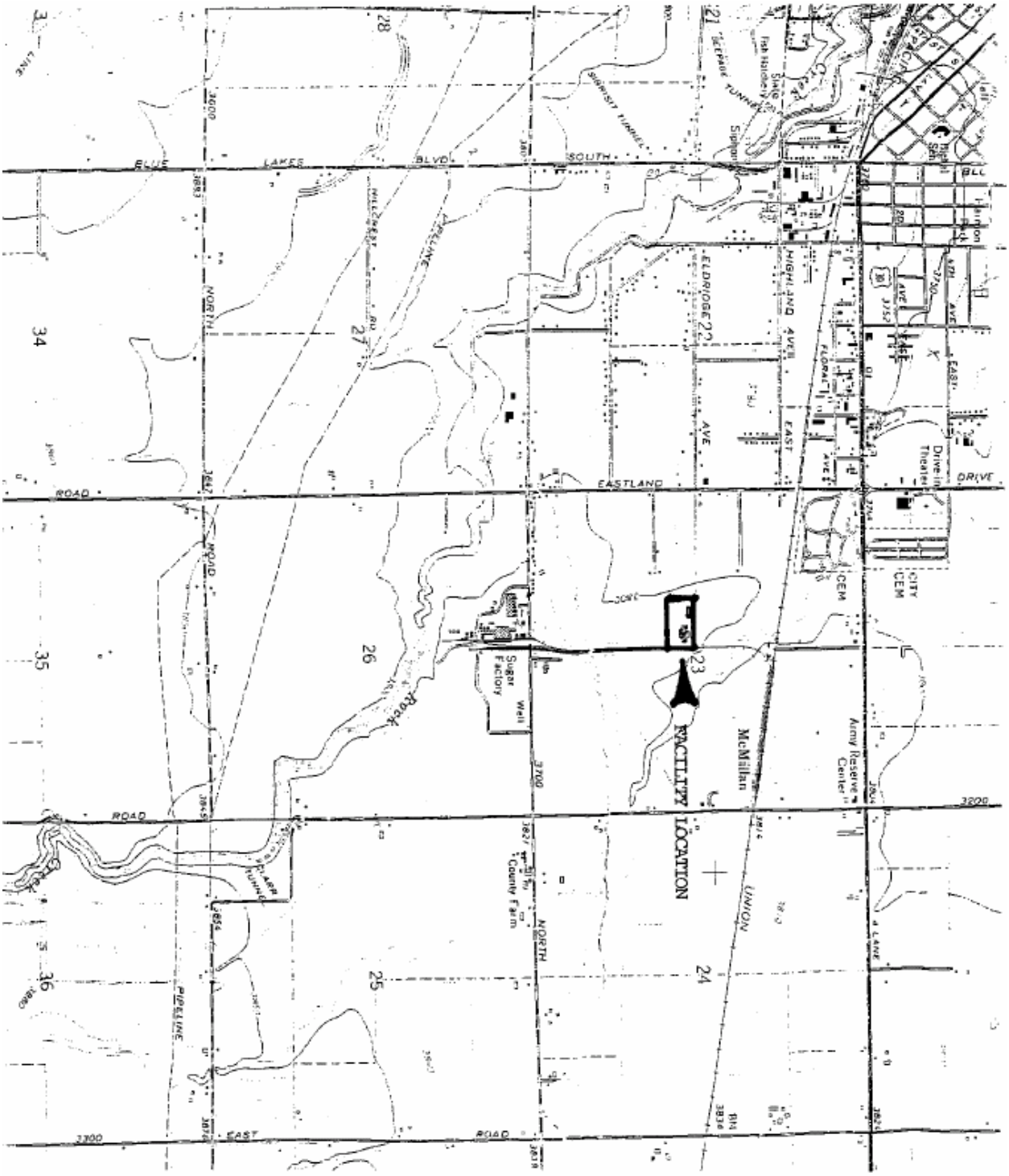
APPENDIX 2

Keegan Inc.

Wastewater Land Application Permit

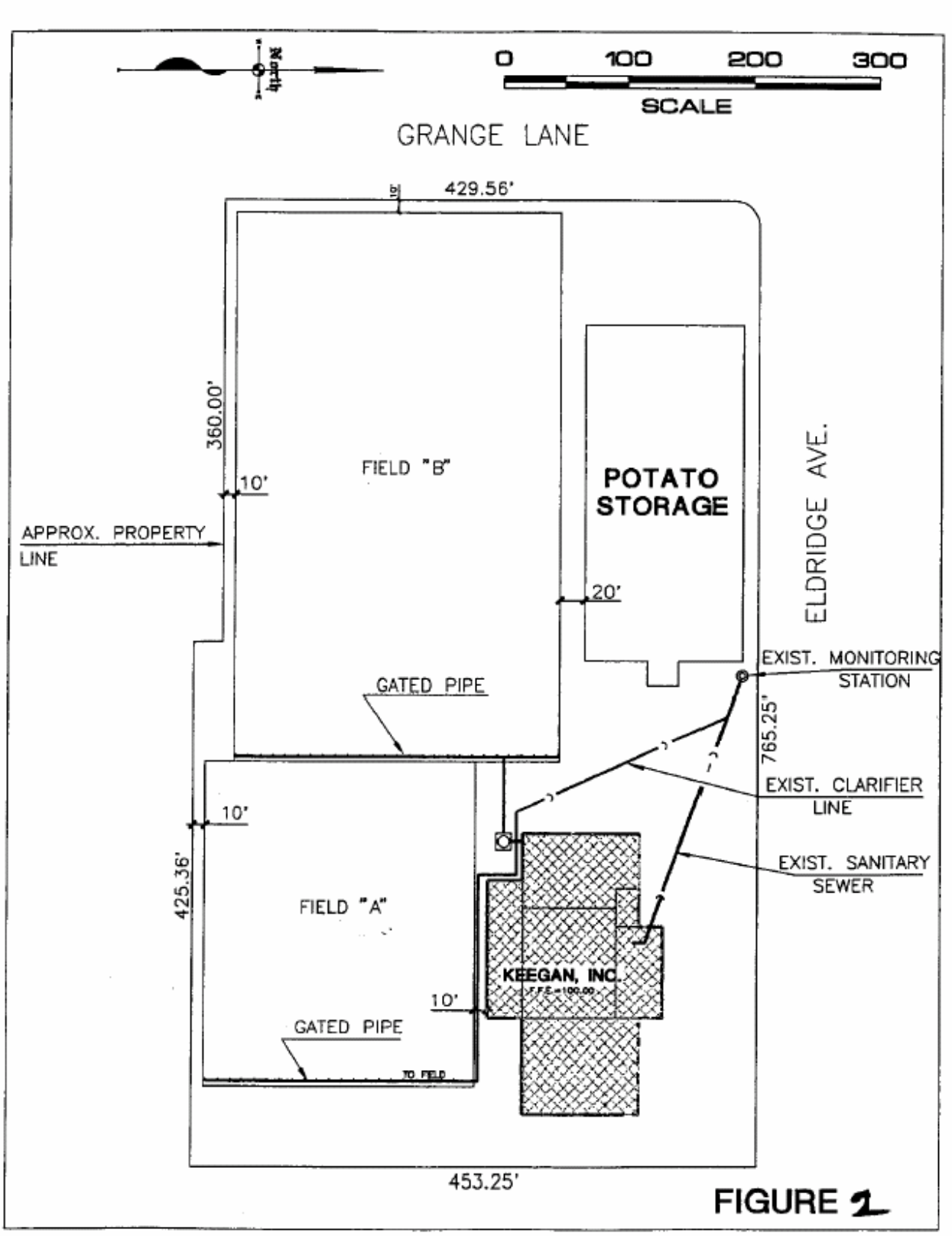
LA-000044-03

SITE MAPS



SITE LOCATION MAP

FIGURE 1


0
100
200
300
SCALE
GRANGE LANE
429.56'
360.00'
FIELD "B"
POTATO STORAGE
ELDRIDGE AVE.
10'
APPROX. PROPERTY LINE
20'
EXIST. MONITORING STATION
GATED PIPE
765.25'
EXIST. CLARIFIER LINE
10'
425.36'
EXIST. SANITARY SEWER
FIELD "A"
KEEGAN, INC.
10'
GATED PIPE
TO FIELD
453.25'
FIGURE 1

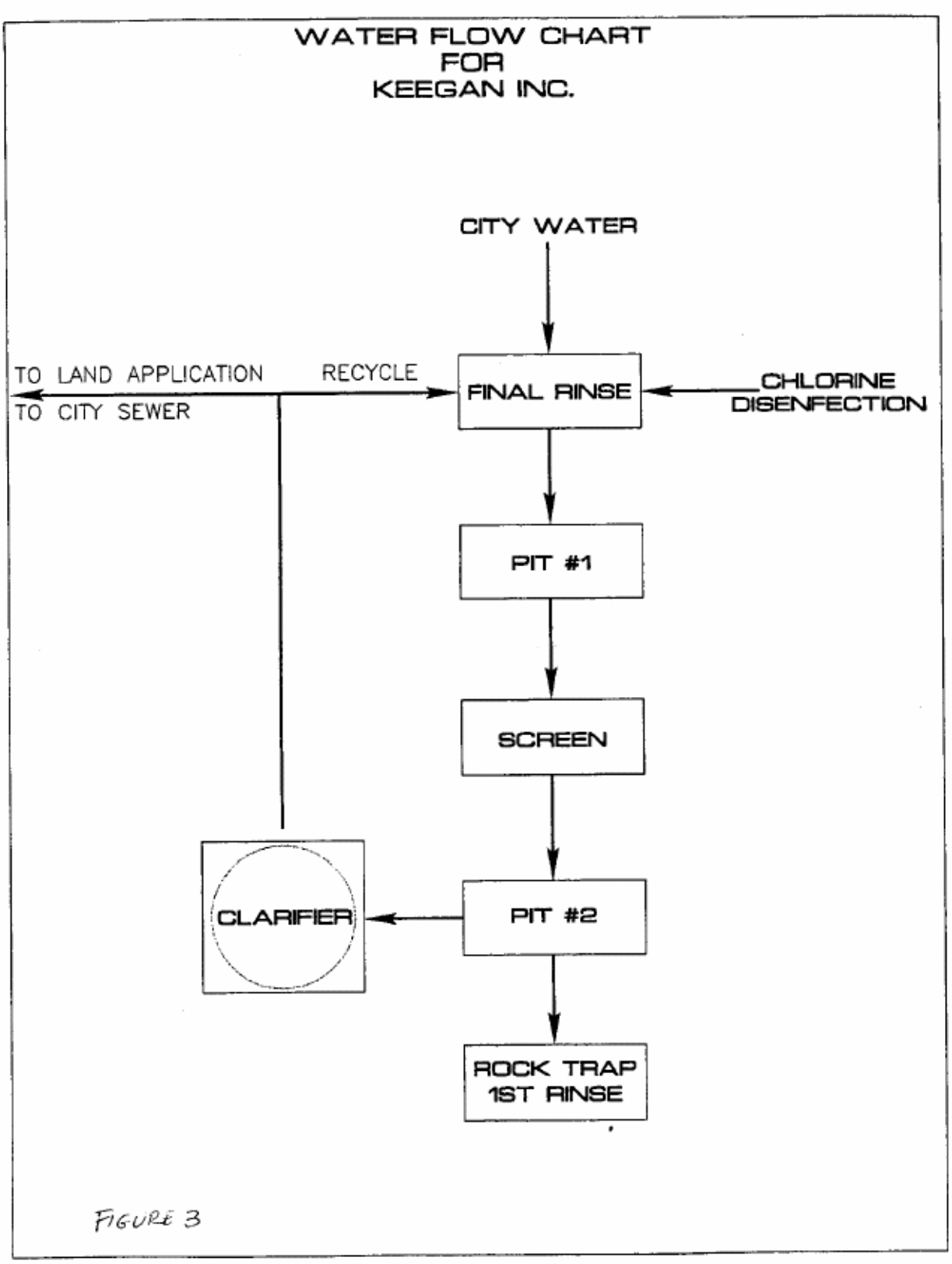

WATER FLOW CHART
FOR
KEEGAN INC.
CITY WATER
TO LAND APPLICATION
RECYCLE
TO CITY SEWER
FINAL RINSE
CHLORINE
DISENFECTION
PIT #1
SCREEN
CLARIFIER
PIT #2
ROCK TRAP
1ST RINSE

FIGURE 3